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(54) **PHOTOCHROMIC RESIN COMPOSITION AND ITS PRODUCTION**

(57) Abstract:

PURPOSE: To obtain a resin compsn. which comprises a vinyl resin and a photochromic substance dispersed therein and exhibits a remarkable color change at a low amt. of the substance dispersed by improving the vinyl resin.

spiroxazine

CONSTITUTION: This resin compsn. is obtd. by using a copolymer which is obtd. by copolymerizing 70wt.% or lower vinyl monomer which forms a hydrophobic vinyl polymer having a glass transition point of 100°C or higher with 30wt.% or higher vinyl monomer which forms a hydrophobic vinyl polymer having a glass transition point of 25°C or lower.

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TITLE: Colour-changeable resin compsn. and
mfr. - comprising suspension polymerisation of two
monomers capable of forming high- and low Tg hydrophobic
vinyl polymers with photochromic substance and radical
polymerisation initiator

PATENT-ASSIGNEE: SEKISUI PLASTICS CO LTD[SEKP]

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ABSTRACTED-PUB-NO: JP 06220247A

BASIC-ABSTRACT:

Compsn. comprises a photochromic substance dispersed in a hydrophobic vinyl resin, wherein said resin is a copolymer of a monomer capable of forming a hydrophobic vinyl polymer with Tg of at least 100 deg.C and a monomer capable of forming a hydrophobic vinyl polymer with Tg of up to 25 deg.C. The content of the latter is at least 30 wt.%.

Also claimed is the mfr. of the resin compsn. comprising mixing the comonomers and conducting a suspension polymerisation with a radical polymerisation initiator e.g. azonitriles (not contg. a benzene ring or a carboxyl gp.), peroxyketals or alkylperoxides, and a photochromic substance in an aq. medium.

ADVANTAGE - Photochromic substance in the copolymer readily changes its structure by light, strongly generating a colour and reducing the amt. of expensive photochromic compsn. to be added.

In an example, the high Tg (100 deg.C) monomer was styrene and divinylbenzene. The low Tg (-22 deg.C) monomer was ethylacrylate. 65 pts. of styrene, 5 pts. of divinylbenzene and 30 pts. of ethylacrylate were mixed and 600g of the mixt. was mixed with 1.2g of 2,2'-AIBN and 1.8g of a spiroxazine photochromic substance ('Photocrome 12' of Japan chemix KK). This was further mixed with a mixt. of Na-laurylsulphate (0.05g), 150g of Ca-tripphosphate and 3 kg water. Polymerisation was conducted at 70 deg.C for 10 hrs. at 4 m/s agitator blade tip speed. Particle size of the prod. resin was 10 microns.

CHOSEN-DRAWING: Dwg.0/0

TITLE-TERMS: COLOUR CHANGE RESIN COMPOSITION MANUFACTURE
COMPRISE SUSPENSION

POLYMERISE TWO MONOMER CAPABLE FORMING HIGH LOW

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to an allochroic resin constituent and its manufacture approach.

[0002]

[Description of the Prior Art] The allochroic resin constituent with which homogeneity comes to distribute the photochromic matter in hydrophobic vinyl system resin is already known. It is indicated by JP,64-20288,A. Moreover, it adds in the photochromic matter and a hydrophobic vinyl system monomer, and this official report distributed this in the aquosity medium, carried out the suspension polymerization of the above-mentioned monomer under existence of the radical polymerization initiator of the azonitrile system which contains neither the benzene ring nor a carboxyl group, a peroxy ketal system, or an alkyl peroxide system, and has indicated how to manufacture the above-mentioned allochroic resin constituent.

[0003] It is indicated that acrylic monomers, such as styrene system monomers, such as styrene, alpha methyl styrene, chloro styrene, and a divinylbenzene, acrylic-acid low-grade alkyl ester, and methacrylic-acid low-grade alkyl ester, can be used for the above-mentioned official report as a hydrophobic vinyl system monomer. Moreover, although it has also indicated that those monomers can be mixed and used for this official report, in the example, the case where a methyl methacrylate is used independently is only hung up, and the case at the time of mixing and using a monomer is not indicated at all.

[0004] Moreover, the 26 - 29th page (poly file) of Polyfile of the 112-month, 1988 issuance indicate that it is not desirable to use a polyvinyl chloride and an ethylene-vinyl chloride copolymer for the hydrophobic vinyl system resin which includes the photochromic matter, and it mentions polymethacrylate, a cellulosic, polystyrene, a styrene copolymer, phenoxy resin, polyurethane, etc. as desirable resin. Furthermore, the rate of color developing and reducing is indicated that there is an inclination for a heat return reaction to become slow by the resin by which the hydroxyl group remains like phenol resin or phenoxy resin.

[0005]

[Problem(s) to be Solved by the Invention] This artificer examined the pattern of that discoloration about the allochroic polymethyl-methacrylate particle made according to instruction of JP,64-20288,A. Consequently, the polymethyl-methacrylate particle made according to this official report got to know that that coloring had the need of adding the photochromic matter so much in order to obtain sufficient coloring palely therefore, although it colored when daylight and ultraviolet rays were irradiated. Since the photochromic matter is expensive, even if it turns to what kind of application, when aiming at exploitation of an application, it serves as a serious failure by this being used so much. Then, he only used the little photochromic matter and has noticed that it is necessary to improve so that it may color still more notably. This invention is produced considering such need as a consideration.

[0006]

[Means for Solving the Problem] This artificer found out that the above-mentioned technical problem was solvable by changing the presentation of the resin used as the parent of an allochroic resin constituent, as a result of repeating experiments various for the above-mentioned technical-problem solution. That is, although the resin which serves as the above-mentioned parent with the homopolymer of a hydrophobic vinyl system monomer had been made until now, we decided to constitute the hydrophobic vinyl system resin which serves as a parent with the copolymer of a hydrophobic vinyl system monomer anew in this. And we decided to constitute from a copolymer of the (monomer) in which a glass transition point forms a hydrophobic vinyl system polymer 100 degrees C or more for this resin, and the (monomer) in which a glass transition point forms a hydrophobic vinyl system polymer 25 degrees C or less. Furthermore, when the monomer with the latter lower glass transition point was occupied 30% of the weight or more in [all] the copolymer in this case, it found out that a resin constituent with the coloring remarkable here by the photochromic matter was obtained. This invention is completed based on such knowledge.

[0007] In the allochroic resin constituent with which, as for this invention, it comes to distribute the photochromic matter in hydrophobic vinyl system resin With the copolymer of the monomer in which a glass transition point forms a hydrophobic vinyl system polymer 100 degrees C or more, and the monomer in which a glass transition point forms a hydrophobic vinyl system polymer 25 degrees C or less The latter monomer makes a summary the allochroic resin constituent characterized by using the copolymer which occupies 30 % of the weight or more in the copolymer as the above-mentioned hydrophobic vinyl system resin.

[0008] Moreover, this invention also includes the manufacture approach of the above-mentioned allochroic resin constituent. The monomer in which, as for the manufacture approach, a glass transition point forms a hydrophobic vinyl system polymer 100 degrees C or more, The monomer in which a glass transition point forms a hydrophobic vinyl system polymer 25 degrees C or less is mixed. The radical polymerization initiator of the azonitrile system in which the latter monomer occupies 30 % of the weight in monomer mixture, and contains neither the benzene ring nor a carboxyl group, a peroxy ketal system, or an alkyl peroxide system, It is characterized by

distributing the mixture which added the photochromic matter to the above-mentioned monomer mixture, and was obtained in an aqueous medium, and carrying out the suspension polymerization of the monomer mixture.

[0009] This invention is characterized [greatest] by using at least two kinds of monomers of the monomer (this is hereafter called high transition monomer) in which a glass transition point forms a polymer 100 degrees C or more on the basis of the glass transition point of a polymer, and the monomer (this is hereafter called low transition monomer) in which a glass transition point forms a polymer 25 degrees C or less.

[0010] Things various as a high transition monomer can be used. If an example is given, methacrylic-acid system monomers, such as aromatic series vinyl monomers, such as styrene, alpha methyl styrene, chloro styrene, and a divinylbenzene, a methyl methacrylate, ethylene glycol dimethacrylate that works as a cross linking agent further, and trimethylolpropanetrimethacrylate, can be used. These can be used even if it mixes, even when it is independent.

[0011] Things various as a low transition monomer can be used. For example, since a methyl acrylate forms the polymer whose glass transition point is 8 degrees C, it is a low transition monomer. Moreover, since an ethyl acrylate forms the polymer whose glass transition point is -22 degrees C, 2-ethylhexyl acrylate forms the polymer whose transition point is -85 degrees C and methacrylic-acid normal butyl forms the polymer whose transition point is 20 degrees C, all are low transition monomers. In addition, as a low transition monomer, methacrylic ester, such as acrylic-acid ETESURU, such as acrylic-acid isopropyl, acrylic-acid normal butyl, and isobutyl acrylate, and 2-ethylhexyl methacrylate, methacrylic-acid normal DESHIRU, and methacrylic-acid normal dodecyl, can be used. These can be used even if it mixes again, even when it is independent.

[0012] It mixes and a high transition monomer and a low transition monomer are used so that the latter may occupy 30 % of the weight or more in monomer mixture. Among those, it is desirable then to mix and use so that the latter may occupy 50 % of the weight or more. The reason is that the effectiveness that the latter makes change of a color remarkable at less than 30 % of the weight is not accepted. Moreover, although the latter upper limit does not exist in after that a color changes, it may exist from another application side.

[0013] A well-known thing is used as photochromic matter which can be used by this invention. What is used here may produce color tone change (change of a light absorption property) for isomerization, tautomerization, ionic dissociation, radical dissociation, oxidation reduction, excitation state change, etc. by any at the time of the exposure of light. It is desirable to use the organic substance in respect of the quick nature of color change. As these examples, each compound of dimethylaminoazobenzenes, salicylidene aniline, nitrobenzyl pyridines, SUPIRO pyrans, SUPIRO oxazine, tetra-KURORU-alpha-keto dihydronaphthalene, screws (triphenyl imidazolyl), triphenylmethane color RYURO nitril, tetra-phenylhydrazines, BIAN SURON, and pyridyl sydnone can be used. For a certain reason, these choose suitably what changes a color tone variability region according to the class of substituent, and are used. SUPIRO pyrans have the high effectiveness of the luminescent color, and a color is clear, and since there

are also many classes of color, it is especially suitable. Moreover, since the endurance in the case of carrying out repeat coloring is high, SUPIRO oxazine is suitable.

[0014] The photochromic matter is dissolved and used into the monomer which usually forms resin. The addition changes with extent of coloring made into the object, and is suitably determined in the range which checks neither a polymerization nor a suspension condition in consideration of the range of a coloring property and a monomer which can be dissolved. The addition is usually 0.005 to 1% of the weight of the range to a monomer. Even if it adds the photochromic matter across the range which can be dissolved, the amount of excess hardly contributes to coloring of resin.

[0015] In order to promote coloring by the photochromic matter, a well-known assistant may be added. As an assistant, a phenolic compound like the bisphenol derivative which gives deep coloring, a hydroxybenzoic-acid derivative, and HINDATO phenols can be added by delaying a heat return reaction by (Thermal T) mold photochromic matter to which a thing with the sensitization effectiveness, such as a benzophenone, 4, and 4'-dimethoxy benzophenone, an acetophenone, dibenzoylmethane, a benzoyl trifluoro acetone, a benzoylacetone, and triphenyl, and a discharge happen with heat. However, it is necessary to use these assistants in the range which does not check a suspension polymerization.

[0016] In order to make the allochroic resin constituent concerning this invention, a high transition monomer and a low transition monomer are mixed, and the latter monomer occupies 30% of the weight or more of all monomers, a radical polymerization initiator and the photochromic matter are added to this, the suspension polymerization of this mixture is carried out, and it considers as an allochroic resin constituent with the obtained copolymer.

[0017] A radical polymerization initiator is chosen from the things of the azonitrile system which contains neither the benzene ring nor a carboxyl group, a peroxy system, or an alkyl peroxide system, and is used. There is the following in such a polymerization initiator. For example, 2 and 2'-azobisisobutyronitril, 2, and 2'-azobis (2, 4-dimethylvaleronitrile), 1, and 1-screw (tert-butyl peroxide) - They are 3, 3, 5-trimethyl cyclohexane, 2, and 2-screw (tert-butyl peroxide) octane, n-butyl -4, 4-screw (tert-butyl peroxide) valerate, 2, and 2-screw (tert-butyl peroxide) butane, di-t-butyl peroxide, etc. This polymerization initiator is usually used to a monomer by 0.05 to 1% of the weight of within the limits.

[0018] In order to carry out the suspension polymerization of the above-mentioned monomer mixture, it is necessary to distribute monomer mixture in an aqueous medium. For that, a dispersant and a surfactant are needed. As the dispersant, it is suitable to use polyvinyl alcohol, calcium phosphate, double decomposition magnesium pyrophosphate, etc., for example, and sodium alkylsulfate etc. is suitable as a surfactant.

[0019] Moreover, in order to carry out the suspension polymerization of the above-mentioned monomer mixture, it is necessary to agitate the polymerization system which consists of monomer mixture and an aqueous medium. It is necessary to perform churning moderately according to the diameter of the polymer particle made into the object. For example, when it is going to obtain the particle whose mean particle diameter is about several 10 micrometers, it is necessary to make peripheral velocity at the head of

an impeller into the high speed of about several m/second. In such a case, it is convenient to make emulsification equipments, such as a homogenizer, it not only to agitate by the impeller, but distribute.

[0020] In order to perform an above-mentioned suspension polymerization, it is necessary to heat a polymerization system at first. It is necessary to carry out heating beyond the temperature to which a polymerization initiator starts decomposition. The temperature is usually within the limits of 40-100 degrees C. Since a polymerization reaction is exothermic reaction, if a polymerization is started, a polymerization system will serve as an elevated temperature gradually. So, when the temperature of a polymerization system goes up too much, as a polymerization system is cooled, the temperature of a polymerization system is adjusted. In this way, a polymerization is completed while several hours pass.

[0021] After a polymerization finishes, except for a superfluous monomer, a copolymerization particle is separated from an aqueous medium. Subsequently, the obtained copolymer particle is rinsed and it dries. In this way, the obtained copolymer particle contains the photochromic matter in the state of distribution in it. This is the allochroic resin constituent made into the object.

[0022] Although the above explained only the high transition monomer and the low transition monomer, it is the range which does not spoil the function of the structural change by light in the copolymer of the photochromic matter which means other monomers which are alike other than this in this invention, and belong to that neither by this invention, and it is also possible to carry out a little activity.

[0023]

[Effect of the Invention] Since the low transition monomer moreover occupied 30 % of the weight or more in the copolymer in the copolymer using the resin which mixed the high transition monomer and the low transition monomer, and was used as the copolymer according to this invention, it becomes easy in a copolymer to change the photochromic matter structurally according to light, therefore it will color strongly. Consequently, this allochroic resin constituent becomes what is notably colored by the exposure of light, therefore the addition of an expensive photochromic constituent can be reduced. This effect of the invention is large at this point.

[0024] An example and the example of a comparison are given to below, and the reason which is excellent in this invention is explained concretely. In the following examples and examples of a comparison, the section only means the weight section.

[0025]

[Example 1] In this example, the ethyl acrylate was used as a low transition monomer, using styrene and a divinylbenzene as a high transition monomer. Styrene forms the polymer whose glass transition point is 100 degrees C, and an ethyl acrylate forms the polymer whose glass transition point is -22 degrees C.

[0026] The styrene 65 section and the divinylbenzene 5 section were mixed, it considered as the high transition monomer, the ethyl-acrylate 30 section was mixed to this, and monomer mixture was made. As a polymerization initiator, 2 and 2'-azobisisobutyronitril 1.2g and 1.8g (the product made from Japanese KEMIKKUSU, trade name photograph

loam #12 coloring purplish red) of SUPIRO oxazine system photochromic matter were added, and it considered as mixture at 600g of this monomer mixture.

[0027] Independently, the autoclave made from stainless steel of 5l. capacity put in 150g of calcium phosphate, and 0.05g of sodium lauryl sulfate and 3kg of water. 600g of monomer mixture of the above-mentioned photochromic matter content was put in in this autoclave. The polymerization was performed at 70 degrees C for 10 hours, nitrogen gas having permuted the inside of an autoclave after that, and agitating the peripheral velocity at the head of an impeller as 4m/second. In this way, from the autoclave, it dissociated from ejection and an aqueous medium, rinsing desiccation of the obtained polymer particle was carried out, and the allochroic resin constituent whose mean particle diameter is about 10 micrometers was obtained.

[0028] When the obtained microparticulate allochroic resin constituent irradiated daylight and the light from an ultraviolet ray lamp at this, having colored [begin] immediately was admitted. It is the above-mentioned photograph loam to the resin which consists only of resin which consists only of polystyrene, or a polymethyl methacrylate about extent of coloring. It compared with the index sample which added 1.8g (A), 3.6g (B), 5.4g (C), and 7.2g (D), and made #12 like the top. Coloring immediately after [5cm] by the way irradiating for 15 minutes specifically compared from the ultraviolet ray lamp (black light mold 20W, 365nm), and the rank equivalent to any of Above A, B, C, and D estimated. Therefore, at this assessment, A will be coloring with strongest D in the weakest coloring. It means that the color enhancement of the resin constituent obtained in this example is equivalent to B of an index sample thru/or C, therefore had shown one about 2.5 times the color enhancement [criteria, then] of this for the amount of the photochromic matter used.

[0029]

[Example 2] In this example, it carried out completely like the example 1 except having changed the monomer. The monomer used in this example was the mixture which added the acrylic-acid normal butyl 40 section as a low transition monomer to this, using the mixture of the styrene 55 section and the divinylbenzene 5 section as a high transition monomer. In addition, since a glass transition point forms the polymer which is -54 degrees C, acrylic-acid normal butyl corresponds to a low transition monomer clearly.

[0030] It processed completely like the example 1 and the allochroic resin constituent was obtained. When the color enhancement after an exposure is investigated with an ultraviolet ray lamp completely like an example 1 about this constituent, it means that color enhancement is equivalent to C of an index sample, therefore had shown one about 3 times the color enhancement [criteria, then] of this for the amount of the photochromic matter used.

[0031]

[Example 3] In this example, it carried out completely like the example 1 except having changed the monomer. Using the mixture of the styrene 35 section and the divinylbenzene 15 section as a high transition monomer, the monomer used in this example mixed the acrylic-acid normal butyl 50 section as a low transition monomer to this, and was made.

[0032] It processed completely like the example 1 and the allochroic resin constituent was

obtained. When the color enhancement after an ultraviolet ray lamp exposure was investigated completely like the example 1 about this constituent, color enhancement was equivalent to C thru/or D of an index sample, therefore showed one about 3.5 times the color enhancement [criteria, then] of this for the amount of the photochromic matter used.

[0033]

[Example 4] In this example, it carried out completely like the example 1 except having changed the monomer. The monomer used in this example adds and makes the acrylic-acid normal butyl 50 section as a low transition monomer to this, using the mixture of the styrene 25 section and the divinylbenzene 25 section as a high transition monomer.

[0034] It processed completely like the example 1 and the particle of an allochroic resin constituent was obtained. When coloring after UV irradiation is investigated completely like an example 1 about this particle, it means that color enhancement is equivalent to C thru/or D of an index sample, therefore had shown one about 3.5 times the color enhancement [criteria, then] of this for the amount of the photochromic matter used.

[0035]

[Example 5] In this example, it carried out completely like the example 1 except having changed the monomer. The monomer used in this example adds the acrylic-acid normal butyl 50 section to this as a low transition monomer, using the mixture of the styrene 15 section and the divinylbenzene 35 section as a high transition monomer.

[0036] It processed completely like the example 1 and the particle of an allochroic resin constituent was obtained. When color enhancement is investigated completely like an example 1, it means that color enhancement is equivalent to B of an index sample thru/or C, therefore had shown one about 2.5 times the color enhancement [criteria, then] of this for the amount of the photochromic matter used about this particle.

[0037]

[Example 6] In this example, it carried out completely like the example 1 except having changed the monomer. The monomer used in this example adds the acrylic-acid normal butyl 85 section to this as a low transition monomer, using the ethylene glycol dimethacrylate 15 section as a high transition monomer.

[0038] It processed completely like the example 1 and the particle of an allochroic resin constituent was obtained. When color enhancement is investigated completely like an example 1 about this particle, it means that color enhancement is equivalent to D of an index sample, therefore had shown criteria, then about 4 times as many coloring as this for the amount of the photochromic matter used.

[0039]

[Example 7] In this example, it carried out completely like the example 1 except having changed the monomer. The monomer used in this example adds the acrylic-acid normal butyl 30 section to this as a low transition monomer, using the mixture of the methyl-methacrylate 65 section and the ethylene glycol dimethacrylate 5 section as a high transition monomer. Since a glass transition point forms the polymer which is 105 degrees C, the methyl methacrylate corresponds to the high transition monomer clearly.

[0040] It carried out completely like the example 1 and the particle of an allochroic resin

constituent was obtained. When color enhancement is investigated completely like an example 1 about this particle, it means that color enhancement is equivalent to C of an index sample, and had shown criteria, then about 3 times as many coloring as this for the amount of the photochromic matter used.

[0041]

[Example 8] In this example, it carried out completely like the example 1 except having changed the monomer. The monomer used in this example adds the 2-ethylhexyl acrylate 30 section to this as a low transition monomer, using the mixture of the styrene 65 section and the divinylbenzene 5 section as a high transition monomer. Since a glass transition point forms the polymer which is -85 degrees C, 2-ethylhexyl acrylate corresponds to the low transition monomer clearly.

[0042] When it carried out completely like the example 1, the allochroic resin particle was obtained and color enhancement was investigated about this particle, color enhancement was equivalent to C of an index sample, and showed criteria, then about 3 times as many coloring as this for the amount of the photochromic matter used.

[0043]

[Example 9] In this example, it carried out completely like the example 1 except having changed the monomer. The monomer used in this example adds the methacrylic-acid normal butyl 60 section to this as a low transition monomer, using the mixture of the styrene 35 section and the divinylbenzene 5 section as a high transition monomer. Since a glass transition point forms the polymer which is 20 degrees C, methacrylic-acid normal butyl corresponds to the low transition monomer clearly.

[0044] When it carries out completely like an example 1, an allochroic resin particle is obtained and color enhancement is investigated about this particle, it means that color enhancement is equivalent to C of an index sample, and had shown criteria, then about 3 times as many coloring as this for the amount of the photochromic matter used.

[0045]

[Example 10] In this example, it carried out completely like the example 1 except having changed the monomer and having added the assistant to the excess. The monomer used in this example adds the methacrylic-acid normal butyl 60 section to this as a low transition monomer as well as an example 9, using the mixture of the styrene 35 section and the divinylbenzene 5 section as a high transition monomer. Moreover, as an assistant, IRUGA NOx 1010 (Ciba-Geigy make) 0.3g belonging to hindered phenols was added as a coloring improver by heat return delay.

[0046] Except it, it carried out completely like the example 1 and the particle of an allochroic resin constituent was obtained. When color enhancement is investigated about this particle, it means that color enhancement is equivalent to C thru/or D of an index sample, and had shown one about 3.5 times the color enhancement [criteria, then] of this for the amount of the photochromic matter used.

[0047] As compared with the color enhancement of an example 9, synergism was clearly accepted in this color enhancement.

[0048]

[The example 1 of a comparison] In this example of a comparison, it carried out

completely like the example 1 except having changed the monomer. Although the amount of the low transition monomer used was made into 30 or less % of the weight in monomer mixture in this example of a comparison, the monomer used there adds the acrylic-acid normal butyl 20 section to this as a low transition monomer, using the mixture of the styrene 75 section and the divinylbenzene 5 section as a high transition monomer.

[0049] It processed completely like the example 1 and the particle of an allochroic resin constituent was obtained. When coloring after UV irradiation is investigated completely like an example 1 about this particle, color enhancement will be equivalent to A of an index sample, therefore will be comparable as a thing given [the amount of the photochromic matter used] in criteria, then JP,64-20288,A, and will be improved at all.

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CLAIMS

[Claim(s)]

[Claim 1] The allochroic resin constituent to which the latter monomer is characterized by using the copolymer which occupies 30 % of the weight or more in the copolymer as the above-mentioned hydrophobic vinyl system resin with the copolymer of the monomer by which a glass transition point forms a hydrophobic vinyl system polymer 100 degrees C or more in the allochroic resin constituent with which it comes to distribute the photochromic matter into hydrophobic vinyl system resin, and the monomer in which a glass transition point forms a hydrophobic vinyl system polymer 25 degrees C or less.

[Claim 2] The monomer in which a glass transition point forms a hydrophobic vinyl system polymer 100 degrees C or more, The monomer in which a glass transition point forms a hydrophobic vinyl system polymer 25 degrees C or less is mixed. The radical polymerization initiator of the azonitrile system in which the latter monomer occupies 30 % of the weight or more in monomer mixture, and contains neither the benzene ring nor a carboxyl group, a peroxy ketal system, or an alkyl peroxide system, The manufacture approach of the allochroic resin constituent characterized by distributing the mixture which added the photochromic matter to the above-mentioned monomer mixture, and was obtained in an aquosity medium, and carrying out the suspension polymerization of the monomer mixture.

[Translation done.]